Ontario

ORDER NO. 92-017
FEBRUARY 1992
AGDEX 400/60

Factsheet

LIVESTOCK FEED TERMS DEFINED

(Revision of Factsheet "Livestock Feed Terms Defined", June 1983)

Gwen McBride, Susan Pynenburg and **Janet Carroll**, Feed Advisory Program, Animal Industry Branch

AD LIBITUM (ad lib)
Feed offered free-choice, allowing animals to eat as much as they desire.

AS FED BASIS
An expression of feed nutrient content with moisture included. Nutrient content on an "as fed" basis is always lower than on a "dry matter" basis.

AVERAGE DAILY GAIN (ADG)
The average daily liveweight increase of a growing animal; usually expressed in kg, g or lb./day.

BALANCED RATION
A 24-hour feed allowance that provides an animal with appropriate amounts and proportions of all nutrients required for a given level of performance.

COLOSTRUM
The milk secreted by female mammals for the first few days after giving birth. It is particularly rich in nutrients and antibodies essential for newborn survival.

DIGESTIBILITY
A measure of the extent a feed or nutrient is digested; usually expressed as a percent.

DIGESTION
The changes that occur to a feed within the animal's digestive tract to prepare it for absorption and use.

DRY MATTER
Feed residue left after all moisture has been removed by drying (i.e., 100% dry matter).

DRY MATTER BASIS
An expression of feed nutrient content after the moisture has been removed by drying. Used to compare nutrient composition or animal intake of feeds differing in moisture content.

ENERGY
A nutrient essential for maintenance, growth, production and reproduction. Energy is required in larger amounts than any other nutrient except water, and is often the limiting factor in livestock production.

ENERGY TERMINOLOGY

Gross Energy (GE)
The total combustible energy in a feed, determined by measuring the amount of heat produced when a feed sample is completely burnt in a bomb calorimeter.

Digestible Energy (DE)
Energy that is available to the animal by digestion; measured as the difference between gross energy content of a feed and the energy contained in the animal's feces (gross energy minus fecal energy.)

Metabolizable Energy (ME)
A measure of the useful energy in a feed. It represents that portion of the feed gross energy not lost in the feces, urine and belched gas.

Net Energy (NE)
The amount of feed energy actually available for animal maintenance and production. It represents the energy fraction in a feed left after fecal, urinary, gas and heat losses are deducted from the gross energy value of a feed.

Total Digestible Nutrients (TDN)
A term describing the energy value of feedstuffs, comparable to DE in accuracy. TDN over-estimates the energy value of roughages in comparison to grains.

ENERGY MEASUREMENTS

Calorie
A measure of energy; usually expressed as kilocalorie (kcal) or megacalorie (Mcal). 1 cal = the amount of energy required to increase the temperature of 1 g of water 1 degree C.

Joule
A unit adopted by Systeme International (SI) for expressing energy. The Joule is more commonly used in Europe than in North America (4.184 J = 1 calorie).

FAT
A term used in a general sense to refer to both fats and oils. Fat supplies 2.25 times as much energy as carbohydrates. Both fats and oils share the same general structure and chemical properties, but have different physical properties, i.e., oils are liquid at room temperature.

FAT TERMINOLOGY

Protected Fat
A fat that has been treated or combined with another substance to prevent breakdown in the rumen.

Saturated Fat
A completely hydrogenated fat. Saturated fats are solid at room temperature. Example: animal tallow.

Unsaturated Fat
Any fat that is not completely hydrogenated. Unsaturated

fats are liquid at room temperature. Examples: corn oil, vegetable oil.

FEED (FEEDSTUFF)
An edible material that contributes nutrients to animals' diets.

FEED ADDITIVES
Products added to basic feed mixes to improve the rate and/or efficiency of gain, prevent certain diseases, or preserve feeds. A partial listing includes:

Antibiotic
A class of drug usually produced by living organisms (molds, bacteria or green plants), which can inhibit or kill undesirable bacteria. Example: penicillin.

Buffer
A substance used in livestock rations to help resist changes in the acidity of the digestive tract. Examples: sodium bicarbonate, bentonite.

Direct Fed Microbials (Probiotics)
A live microbial feed supplement which beneficially affects the host animal. Claims include reduced early mortality, increased growth rate, improved feed conversion, egg quality and animal health.

Enzyme
A complex protein compound produced in living cells which speeds up chemical reactions without itself being changed or destroyed. It is added to animal feeds to supplement low enzyme production by some young animals or to improve utilization of feeds.

Ionophore
A carboxylic polyether antibiotic that affects the transport of ions across cellular membranes and inhibits the growth of some gram positive bacteria. It is used in growing cattle to enhance feed efficiency and stimulate growth (examples: Bovatec, Rumensin).

Melangestrol Acetate (MGA)
A hormone added to diets to suppress estrus cycling and improve feed efficiency and growth rate in feedlot heifers.

Yeast/Yeast Culture
A single cell fungi which improves feed digestion by stimulating microbial activity and stabilizing digestive tract pH. Products packaged as "yeast" consist of cells only; "yeast culture" includes live yeast cells plus growth media.

FEED CLASSIFICATION

Browse
Small stems, twigs, leaves and/or fruits and flowers of shrubs, woody vines and trees.

Byproduct
Feeds produced as a result of industrial manufacturing, plant or animal processing. Examples: distillers grains, beet pulp, meat and bone meal, fish meal.

Chaff
Husks or other seed coverings and other plant parts separated from seed during harvest or processing.

Complete Feed
A thoroughly blended mixture of different feed ingredients formulated to meet specific nutrient requirements.

Concentrate
A classification of feedstuffs high in energy and low in fibre; usually further divided into energy and protein concentrates. Often used interchangeably with supplement. Examples: corn, barley, soybeans.

Forage
Plants or plant parts fed to, or grazed by, domestic animals. Forage may be fresh, dry or ensiled (i.e., pasture, green chop, hay, haylage). Often used interchangeably with roughage.

Liquid Protein Supplement (LPS)
A protein product usually containing molasses, urea, added vitamins and trace minerals; particularly useful in pasture feeding.

Milk Replacer
A substitute for fresh whole milk, fortified with vitamins, minerals and sometimes antibiotics; used as a nutrient source for young animals.

Mineral Supplement
A rich source of one or more mineral elements.

Premix
A uniform mixture of one or more microingredients and a carrier, used to facilitate uniform dispersion of micronutrients into a larger mixture.

Protein Supplement
A feed or mixture of feeds containing 20% or more protein. Examples: soybean meal, canola meal.

Roughage
A term used to describe a feed high in fibre (greater than 18% crude fibre). Roughage tends to be bulky, coarse, and low in energy. Examples: hay, silage, straw.

Silage
Feed preserved by an anaerobic fermentation process. Examples: corn silage, haylage, high moisture corn.

Screenings
Small, imperfect kernels, broken grains, hulls, weed seeds and other foreign material obtained from the cleaning of grain.

Supplement
Feed or feed mixtures rich in one or more of protein, energy, vitamins, minerals or antibiotics. Combined with other feeds to produce a more complete feed.

Sweet Feed
A commercial feed sweetened with molasses to improve palatability.

Total Mixed Ration (TMR)
All ration ingredients, including roughages, mixed mechanically to provide one homogenous mixture. TMRs are used in large dairy or beef feedlot operations.

FEED EFFICIENCY
A ratio describing the amount of feed required per unit of production (grain, milk, eggs)

FEED GRADE
Term to describe the quality of feedstuffs suitable for animal, but not human, consumption.

FEED PROCESSING
Physical or chemical changes in feedstuffs which influence their nutritional value.

FLUSHING
The practice of increasing a female animal's energy intake prior to and during the breeding season; may increase conception rate and/or litter size.

HAY ADDITIVES
Organic acids or acid-forming compounds designed to allow hay to be harvested at higher than normal moisture contents by preventing the microbial activity responsible for spoilage.

LABORATORY TESTS

Acid Detergent Fibre (ADF)
The amount of residue (primarily cellulose, lignin and variable amounts of silica) left after boiling a feed sample in an acid detergent solution. The ADF value is used to predict the energy content (TDN, NE) of forages.

Acid Detergent Fibre - Nitrogen (ADF-N)/
Acid Detergent Insoluble Nitrogen (ADIN)
A laboratory test used to measure the amount of heat damaged protein in hay and haylage.

Ash
The inorganic mineral elements of animals and plants, determined by burning off the organic matter and weighing the residue (ash).

Crude Protein
An estimate of the total protein content of a feed; determined by analyzing the nitrogen content of the feed and multiplying the result by 6.25. Crude protein includes true protein and other nitrogen-containing substances such as ammonia, amino acids, nitrates.

Ether Extract
Laboratory test to measure the total fat content of a feed.

Neutral Detergent Fibre (NDF)
The insoluble fraction containing all plant cell wall components left after boiling a feed sample in a neutral detergent solution. NDF is of low digestibility, but can be broken down somewhat by the digestive tract microorganisms. NDF value is used to predict ruminant feed intake.

MEASUREMENTS

Gram (g)
1/1000 of a kilogram (kg) or 1/28 ounce (28 grams = 1 ounce). A very small unit of weight.

International Unit (IU)
A standard unit of potency of a biological agent (example: vitamin, hormone, antibiotic, antitoxin). Also called a USP unit.

Kilo
A prefix used in the metric system of measurement to represent one thousand. Example: 1 kilogram (kg) = 1,000 grams, 1 kilojoule (KJ) = 1,000 joules.

Mega
A prefix used in the metric system of measurement to represent one million. Example: 1 megacalorie (Mcal) = 1,000,000 calories.

Milli
A prefix used in the metric system of measurement to represent 1/1,000. Example: 1 mg = 1/1,000 g.

Parts per Million (ppm)
A measurement used for nutrients present in very small quantities (example: microminerals); ppm = milligrams per kilogram (mg/kg) or millilitre per litre (ml/l).

pH
A measure of acidity or alkalinity. Values range from 0 (most acidic) to 14 (most alkaline or basic). A pH value of 7.0 is neutral (neither acidic nor alkaline).

METABOLISM
All of the chemical changes nutrients undergo following absorption from the digestive tract.

MICRONUTRIENT
Any ingredient, such as minerals, vitamins or drugs, added in very small amounts to a ration.

MONOGASTRIC
An animal having a single or simple stomach system. Example: swine.

MYCOTOXIN
A substance produced by fungi and toxic to animals, e.g., vomitoxin, zearalenone and aflatoxin.

NON-RUMINANT HERBIVORE
Animals with simple stomachs able to digest roughages and other fibrous feeds because of the microbial population in their hindgut. Examples: horse, rabbit.

NUTRIENTS
Feed components required for the maintenance, production and health of animals (water, carbohydrates, lipids, proteins, minerals and vitamins).

Carbohydrates
Major energy providing substrates including starches, sugars, cellulose and hemicellulose. All carbohydrates contain carbon, hydrogen and oxygen, and are usually divided into two fractions - structural (fibre) and non-structural (sugars and starches).

Non-Structural (Non-Fibre) Carbohydrates (NSC or NFC)
Simple carbohydrates, such as starches and sugars, stored inside the cell which serve as a cellular energy source. Non-structural carbohydrates are rapidly and easily digested by the animal.

Structural Carbohydrates (Fibre)
Complex carbohydrates including cellulose, hemicellulose, lignin and pectin that form the plant cell wall. Measured in the laboratory as neutral detergent fibre (NDF).

Lipids
Substances found in plant and animal tissues that are insoluble in water, but soluble in benzene or ether. Includes fats, oils, glycolipids, phosphoglycerides, waxes and steroids.

Minerals
Inorganic feed elements essential for life.

Macro (or Major) Minerals
Minerals required in relatively large amounts by livestock. Includes calcium (Ca), phosphorus (P), magnesium (Mg), potassium (K), chlorine (Cl), sulfur (S) and sodium (Na).

Micro (or Trace) Minerals
Minor mineral elements required in very small amounts in the ration of animals. Includes manganese (Mn), copper (Cu), zinc (Zn), selenium (Se), iron (Fe), cobalt (Co), iodine (I) and fluorine (Fl).

Protein
Naturally-occurring compounds containing nitrogen, carbon, hydrogen and oxygen, and sometimes sulfur or phosphorus. Proteins are made up of complex combinations of amino acids and are essential for animal growth, production and reproduction.

Amino Acids
Nitrogen-containing compounds that are the building blocks from which protein are made.

Available Protein
The portion of the crude protein that can be used by the animal.

Essential Amino Acids
Amino acids that must be supplied in the diet, as the animal either cannot synthesize them or cannot synthesize them in sufficient quantities to meet requirements.

Estimated Crude Protein from Non-Protein Source (ECP from NPS)
Non-protein nitrogen sources such as urea or ammonia; used in ruminant diets in limited amounts to enhance dietary protein levels.

Non-Essential Amino Acids
Amino acids that can be synthesized by the animal.

Non-Protein Nitrogen (NPN)
Nitrogen not derived from true protein, but can be used by rumen microbes to build microbial protein.

Degradable Intake Protein (DIP)
Portion of intake protein that is degraded (broken down) by rumen microbes to ammonia and amino acids. DIP is used for microbial synthesis.

Undegradable Intake Protein (UIP)
Portion of ingested protein that escapes rumen degradation and is digested directly in the other stomachs or small intestine; generally a more expensive source of protein. Commonly referred to as 'bypass' protein.

Soluble Intake Protein (SIP)
Portion of the protein intake that is completely soluble in rumen fluid and rapidly utilized by bacteria. Soluble protein forms part (or all) of the degradable intake protein (DIP) value of a feed.

Unavailable Protein/Heat Damaged Protein
Portion of the protein irreversibly bound to the fibre fraction in feedstuffs. It is usually a small fraction of the total protein, but can be greatly increased by heat.

Vitamins
Organic compounds that function as parts of enzyme systems essential for many metabolic functions.

Fat Soluble Vitamins
Includes vitamins A, D, E and K. Vitamins A, D and E are supplemented in many livestock rations. Fat soluble vitamins are stored in body fat reserves.

Water Soluble Vitamins
Includes B complex vitamins and vitamin C. Not normally supplemented for ruminants after two months of age because rumen microbes are able to manufacture enough to meet the animal's requirements.

NUTRIENT ALLOWANCES
Recommendations of nutrient amounts necessary for maintenance, growth, gestation, lactation or performance that include a safety margin to account for variability in feeds and animals (e.g., environment, health, storage losses).

NUTRIENT REQUIREMENTS
The minimal amounts of nutrients (energy, protein, minerals and vitamins) necessary to meet an animal's minimal needs for maintenance, growth, reproduction, lactation or work.

PALATABILITY
The appeal and acceptability of feedstuffs. Affected by the taste, odour, texture and temperature of the feed.

PARTICLE SIZE
Measure of the diameter of granular feed materials and/or the length of roughage fragments. Particle size can affect mixing of feed ingredients and digestion rate.

RATION
The 24-hour feed allowance for an individual animal.

RUMINANT
A cud-chewing animal having four stomach compartments. The rumen (first stomach), is a major site of microbial fermentation of feeds permitting breakdown of fibre. Examples of ruminants: cattle, sheep, goats

SILAGE ADDITIVES
Substances added during the ensiling process to enhance the correct and rapid fermentation of the feed.

10M
ISSN 0225-7882